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**Working Paper**

## Central Bank Independence and its Effect on Inflation in the ESCWA Countries

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**ECONOMIC AND SOCIAL COMMISSION FOR WESTERN ASIA (ESCWA)**

**CENTRAL BANK INDEPENDENCE AND ITS EFFECT ON  
INFLATION PERFORMANCE IN THE ESCWA COUNTRIES**

United Nations  
New York, 2011

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## I. INTRODUCTION AND MOTIVATION

The breakdown of the Bretton Wood System in the early 1970s deprived the world economy of the basic mechanism necessary to safeguard price stability. Several governments, particularly in emerging and developing economies, abused monetary policy for the sake of short-term political gains that were responsible for stagflation during the 1970s and early 1980s. Developed economies with wide capital markets maintained price stability mainly due to reputable independent central banks. Prolonged periods of price stability in such countries protected domestic investment, attracted foreign capital and promoted long-term growth. During the 1990s, conventional wisdom concerning inflation and growth was challenged. The new consensus was that price stability is essential in order to promote long-term growth. Several economies, especially the ones suffering from sustained high levels of inflation, consequently found themselves in a tight corner. They urgently needed to reduce the costs of inflation, promote sustained growth, create jobs and develop stable and efficient capital markets. Profound legal changes were introduced worldwide to define central banks' mandate to secure price stability and to freely choose and execute an independent monetary policy.

The intellectual debate supported a general trend of granting more independence to central banks by developing several methods to both measure independence and explore its positive effects on economic performance (Bade & Parkin, 1988; Alesina, 1988; Masciandaro & Tabellini, 1988; Grilli, Masciandaro & Tabellini 1991; Cukierman, Webb & Neyapti, 1992; Eijffinger & Schaling, 1993; Siklos, 1994; Cukierman & Webb, 1995; Briault, Haldane & King, 1996; Radzyner & Riesinger, 1997; Eijffinger & Hoeberichts, 1998; Elgie, 1998; Lybek, 1999; Malisewski, 2000; Dvorsky, 2000; Hochreiter & Kowalski, 2000; Mahadeva & Sterne, 2000; Jacome, 2001; Cukierman et al., 2001; Neyapti, 2001; Berger, De Haan & Eijffinger, 2001; Cukierman, Miller & Neyapti, 2002; Arnone et al., 2007). Other factors further contributed to the promotion of central bank independence worldwide.

According to Cukierman (2008), central banks have gained greater independence in conducting monetary policies in many parts of the world since the 1990s. European countries increased the independence of their central banks as a precondition to conform to the Maastricht treaty and in order to join the European Monetary Union. After successfully stabilizing inflation, several Latin American countries needed some institutional arrangement that would reduce the likelihood of the recurrence of high and persistent inflation in the future. Former socialist countries created Western-modeled independent central banks in an attempt to adopt the market economy and its associated institutional frameworks. Finally, the International Monetary Fund (IMF) promoted greater central bank reform and independence in several developing economies as a means to benefit from the growing trend of financial globalization and to attract more foreign capital urgently needed to promote growth and create jobs.

A number of studies discussed central bank independence in specific world regions. For instance, Grilli, Masciandaro and Tabellini (1991) and Alesina and Summers (1993) discussed central bank independence for industrial countries, Loungani and Sheets (1997) for transition economies, Mehran and others (1998) for the Sub-Saharan African countries, Lybek (1999) for the former soviet countries and Jacome (2001) for Latin American countries. According to our survey of the literature, the independence of central banks in the United Nations Economic and Social Commission for Western Asia (ESCWA) region has neither been measured nor analysed in a manner similar to what is available for other world regions.

Thus, the main objectives of this paper are to measure the ESCWA region's central bank independence and to explore its effects on the inflation performance in these countries. The paper proceeds as follows: in section two, we review major relevant works in the literature. In section three, we present the methodologies followed in this study, as well as the obtained measurements of central bank independence. In sections four and five, we explore the relationship between the ESCWA member countries' central bank independence and inflation rate levels and volatility respectively. In section six, we diagnose the weak legal provisions that contribute to a low degree of central bank independence in the ESCWA member countries

and provide policy recommendations to amend specific provisions that the paper has classified as legally weak. In section seven, we conclude our study.

## II. LITERATURE REVIEW

Bade and Parkin (1988) investigated the relationship between monetary policy and central bank laws of twelve industrial countries during the floating exchange rate years from 1972 to 1986. They considered two dimensions of central bank independence, both political and financial independence. Political independence is determined by the collaboration between the central bank and the government in the formulation of the monetary policy and the procedures for appointing and removing central bank directors. Financial independence is determined by the financial and budgetary relations between the central bank and the government. Bade and Parkin rated central banks according to these determinants. They concluded that central banks that are able to conduct policy-making and appoint directors without government influence deliver a lower rate of inflation but not a lower variability of inflation rate.

Alesina (1988) acknowledged the importance of Bade and Parkin's political independence index and used it to explain the relationship between central bank independence and economic performance. However, Alesina added three main contributions to Bade and Parkin's study. First, Alesina extended the sample of 13 industrial countries to include four further countries using institutional information provided by Masciandaro and Tabellini (1988) and Fair (1980). Second, Alesina criticized Bade and Parkin's for disregarding some institutional changes when measuring and classifying their sample of central banks. To account for such changes, Alesina added a new criterion to determine whether the central bank is required to absorb excess supply of short-term treasury bills or not. Third, while Bade and Parkin gave equal weight to different criteria, Alesina assigned different weight to different criteria. Alesina reached the same conclusion as that of Bade and Parkin, explaining there is an inverse relationship between the degree of central bank independence and the average inflation rate.

Grilliet al. (1991) compared the monetary regimes in eighteen industrial countries during the post-war period (1950- 1989). They identified central bank independence in terms of two dimensions: political independence and economic independence. The central bank is said to be politically independent when it has the capacity to choose the final goals of its monetary policy. Political independence is determined by many factors. First, the procedure for appointing members of the central bank's governing bodies, second, the relationship between these bodies and the government, and third, the formal responsibilities of the central bank. To quantify these three determinants of political independence, Grilli et al. used eight different criteria making their measure more informative than that of Bade and Parkin's, which is based on only three criteria. On the other hand, economic independence is defined by the central bank's autonomy in choosing the proper policy deemed suitable to achieve goals and objectives. Economic independence is also strongly influenced by the amount of money the government decides to borrow from the central bank, in addition to the nature of monetary instruments under the control of the central bank. The above two determinants of economic independence are measured according to seven different criteria. Grilli et al. (1991) found that central bank independence promotes low inflation rates with no apparent cost in terms of real economic performance, irrespective of political institutions.

Eijffinger and Schaling (1993) constructed a measure for central bank policy independence ranging from one (least independent) to five (most independent) based on the same dimensions used by Bade and Parkin (1988) and Grilli et al. (1991). Eijffinger and Schaling's contributions can be summarized in two points. First, they introduced a new criterion, "twin-authority" central bank, to represent the instance where monetary policy formulation is divided between the central bank and the government. Such distribution of power was not mentioned in studies either by Bade and Parkin or by Grilli et al. Second, contrary to Bade and Parkin (1988) and Grilli et al. (1991), Eijffinger and Schaling assigned different weights to different criteria to better access the degree of independence granted to central banks. Owing to these three contributions, Eijffinger and Schaling obtained measures that are different to those deduced by Grilli et al. (1991) for the same central banks.

Cukierman, Webb and Neyapti (1992) introduced a comprehensive study to measure central bank independence and explore its relationship with inflation performances. This study went beyond the realm of the other previous studies in three dimensions. First, the sample of countries used to measure the legal independence index was wider and included 72 countries (21 developed and 51 developing countries). Second, the study covered a longer period of time, from 1950 to 1989. Third, measurements were based on a wider range of criteria, aiming to capture the spirit of the laws rather than interpret stated words. According to Cukierman et al. (1992), the legal index is insufficient to capture the degree of central bank independence. Consequently, their study attempted to capture additional aspects of the actual independence by considering three more behavioral measurements: a turnover rate that measures the actual frequency that a central bank's governor is changed, an index based on a questionnaire focusing on the actual practice of the monetary authority (answered by monetary policy specialists in 23 countries), and an inflation-based index obtained by aggregating the legal index and turnover rates. As for the relationship between central bank independence and inflation rate, Cukierman et al. (1992) found that the variation of inflation rate in industrial countries can be explained by the legal independence of central banks (the legal index and inflation rate are negatively related) and not by the turnover rate of their governors. On the contrary, variations in inflation rates in developing countries can be explained by the turnover rates (turnover rates and inflation rates are positively related) and not by the legal index of stated banks.

Cukierman and Webb (1995) developed a new behavioral index called "The Political Vulnerability of the Central Bank Index", which is an extension of the turnover rate measure introduced in Cukierman et al. (1992). The index measured the ratio of political transition followed within six months by a change in the central bank governor. The six-month period is determined carefully and defined as the political period, the non-political period being defined as longer than six months. A frequent removal of the governor from office after a political transition is a clear indication of political influence on the central bank. The study considered a sample of 64 countries (19 developed and 45 developing countries) covering the period between 1950 and 1989. The paper found the estimated probability of changing the central bank governor is three times larger in the political period than it is in the non-political period. The paper also found significant differences in political vulnerability between the developed and developing countries, as well as among the developing countries of different political regimes, being three times higher in the developing rather than developed countries. The study reveals the following relationships: a significant, positive relationship between political vulnerability and inflation rates, a significant, negative relationship between political vulnerability and economic growth, and an insignificant, negative relationship between political vulnerability and the real deposit rate.

As central banks gained more independence, there were growing calls for holding them more accountable for their policy outcomes. For instance, Levy (1996) criticized central bank independence for being undemocratic, as it is run by non-elected officials whose actions and policies cannot be easily monitored. As a result, several studies added new dimensions to existing legal dimensions in order to account for accountability and transparency and to further understand the determinants of central bank independence.

Briault, Haldane and King (1996) investigated the relationship between central bank goal independence and accountability and developed an accountability index based on four criteria: grading the external monitoring of the central bank by the legislative branch, the publication of meeting minutes dedicated to decide on monetary policy, the publication of monetary policy reports, and the government's ability to override the central bank's delegated responsibility in case of major shocks. They also measured the degree of goal independence in terms of central bank statutes, the structure of the board and the setting of the central bank's goals. The study reveals that goal independence and accountability are inversely related as recommended by Rogoff Model (1985), which contradicts the political explanation of accountability that states independence and accountability should run in parallel.

Lybek (1999) developed a central bank legal independence and accountability index for 15 states in the former Soviet Union between 1995 and 1997. The index incorporated most of the standard criteria in the previous studies, but it is more comprehensive and detailed than other studies as it includes guidelines used

by the Monetary and Exchange Affairs Department and the Legal Department of the IMF when providing technical assistance, so named the IMF- modified index. Lybek intended to make his index more precise compared to other previous indices by using whole numbers and fractions in coding 21 criteria. The empirical results of the study reveal a negative correlation between Lybek's index and the average inflation rate, and subsequently higher growth.

Jacome (2001) measured the legal and accountability index for fourteen Latin American central banks in the 1990s. The index included political and economic dimensions (similar to other studies illustrated above), financial autonomy and accountability and transparency (similar to the IMF-modified index) and a further lender of last resort criterion, which is not included in other studies. The final criteria is important specifically in Latin American Countries who suffered from financial crises and where central banks acted as lender of last resort by expanding credit without consideration of the long-term monetary targets. Therefore, excessive discretionary lending of last resort negatively affects the central bank's rating of independence. The study distinguished between the de jure central bank independence as reflected in the proposed index and the actual or effective central bank independence, which is measured by the rate of governor turnover, as highlighted by Cukierman et al. (1992). The paper found a moderate negative correlation between increased central bank independence and inflation rate and a marginally positive correlation between the turnover rate and inflation rate.

### **III. METHODOLOGIES AND MEASUREMENTS OF CENTRAL BANK INDEPENDENCE**

In this study, we measure two indices of central bank independence. The first is the legal central bank independence and accountability index (the de jure index) using the methodology constructed by Jacome (2001). The legal charters of central banks are used to quantify the different legal and accountability criteria of this index. This index does not necessarily reflect the actual degree of the central banks' independence. Therefore, we include a second index, the turnover rate of the central banks' governors as an alternative proxy of actual central bank independence (the de facto index) . In order to measure that, we followed the methodology of Cukierman et al. (1992). Our sample includes all the ESCWA member countries, namely, Bahrain, Egypt, Iraq, Kuwait, Jordan, Lebanon, Oman, Palestine, Qatar, Saudi Arabia, the Sudan, Syrian Arab Republic, United Arab Emirates, and Yemen. We split this sample into two subsamples, the oil exporting countries (Bahrain, Iraq, Kuwait, Oman, Qatar, Saudi Arabia, the Sudan, United Arab Emirates and Yemen) and the oil importing countries (Egypt, Jordan, Lebanon, Palestine and the Syrian Arab Republic). The period considered in this study is from 1970 to 2009 and the independence measures are quantified by the four decades within this period: 1970-1979, 1980- 1989, 1990-1999 and 2000-2009. In the following two subsections, we will explain both methodologies and draw from them in order to measure the two indices.

#### **A. THE LEGAL INDEPENDENCE AND ACCOUNTABILITY INDEX (THE DE JURE INDEX)**

The legal independence and accountability index is derived by quantifying the legal charters of the different central banks. Such a task is difficult and not objective since many of the bank's provisions are not related to their independence and are different in terms of focus, scope and degree of details (Cukierman et al. 1992). The legal charter does not reflect the actual overall independence of the central bank, however, the policies and authorities of different central banks are governed and practiced according to the laws and regulations that are specified in the legal charters. Therefore, it is important to measure the degree of independence and accountability in such charters as they capture some essential and actual components of independence. In addition, measuring this index would allow us not only to compare the level of independence among different ESCWA countries but it would also allow us to compare the ESCWA region with other world regions where similar studies were conducted. In this section, we present Jacome's (2001) methodology in order to derive the legal independence and accountability index.

According to Jacome (2001), the legal and accountability index depends on five different categories of central bank independence: central bank legal objective, political autonomy, economic autonomy, financial independence and accountability, and transparency. For an independent and effective central bank, price



stability should be the sole and primary objective. A primary objective to preserve price stability would prevent both inflation and deflation and would ensure stable and predictable long-term economic conditions. In addition, a clearly defined objective would allow economic agents to better monitor the monetary policy and to hold it accountable if it fails to meet its policy goals. Such a process would reinforce transparency, credibility and the effectiveness of the monetary policy. Not all central banks have such a primary objective; several central banks have a set of multiple objectives that would support the governmental economic policies in addition to preserving price stability. However, assigning multiple objectives could result in conflicting short and long-term policies that may jeopardize price stability in the long run. In order to prevent this scenario, priority should be given to price stability in case of multiple conflicting objectives.

Political independence of the central bank's board of directors is essential in order to prevent political pressures and influences on the monetary policy from the government and the private sector. The structure and representation of the board members, the appointment and removal procedures, and the members' term in office are important criteria to quantify the degree of legal independence and accountability of the central bank. Government and the private sector favour short-term policies, however, their representation in the board of directors and participation in formulating the interest rate, exchange rate and financial policies may result in a conflict of interest with the long-term objectives of the monetary policy. To prevent undue political appointment, board members should be appointed in a two-step process whereby the government nominates the candidates and a legislative branch confirms the nomination. Removal of board members by the executive branch should occur for strict violations specified in the legal charter of the central bank and such decision should be examined and sanctioned by either an independent tribunal or by the legislature with a qualified majority. A Governor's term of office should be longer than the government's term to avoid the disruption of existing monetary policy by a newly appointed government.

Economic autonomy refers to a central bank's freedom to choose the suitable policy instrument in conducting monetary policy (limiting credit to government) and the mechanism and limitation to act as lender of last resort. Setting interest rate levels should be carried out exclusively by the central bank, while the exchange rate policy should be shared with the government through a necessary and clear conflict resolution mechanism that favours the central bank in case of a policy conflict. The central bank should also negotiate with the government on setting the inflation target as it is in a better position to define the short term trade-off between inflation and employment. A legal prohibition, or at least severe limitation on government financing from the central bank is also essential to ensure the central bank's economic autonomy. Limiting the central bank's credit would reduce fiscal deficit, the major source of inflation, and would enhance more efficient public finance management. Excessive discretion given to the central bank to act as a lender of last resort would encourage excessive risk taking in the financial market and increase pressure on the central bank to bail out any failing financial institutions. As a result, monetary policy would be less independent and would fail to stabilize inflation in the long run.

Central banks have public objectives that should be achieved with no financial restrictions. At the same time, central banks should not seek profitability as this could adversely affect achieving and maintaining their price stability objective. In order to perform an effective monetary policy, there should be clear rules that protect the central bank's integrity from the government's influence. A central bank should have an authorized initial capital and should be allowed to accumulate the required reserve necessary to cover its risks under sound accounting standards. Additional realized profits should be transferred to the government. On the other hand, there should be clear provisions that protect a central bank from potential losses resulting from extended credit to the government that might deplete its initial capital. In such a case, the law should force the government to "recapitalize" the central bank. A financially independent central bank should not perform quasi-fiscal operations, as they would deteriorate its financial position. Also, central banks should not be subject to frequent appropriation measures. Instead, it is advisable to submit an estimate of expenditure for information and accountability purposes. A transparent relationship between the central bank and the government defined by prudent provisions would enhance accountability, independence and effectiveness of monetary policy.

Independent central banks should be held accountable to prevent misuse of power and resources and to make sure that the central bank is using its delegated power effectively and efficiently to achieve its objectives. The central bank should report to the executive and legislative branches on whether previously announced targets are met and on the different policies and actions that were necessary to achieve these targets. Such information should be available to the general public. The central bank should publish the minutes of board meetings so that the public is aware of the central bank's decision-making procedures. The central bank should also publish its financial statements at least once a year and more frequent summaries of its financial data and both should be prepared under international accounting standards.

TABLE 1. VARIABLES FOR LEGAL CENTRAL BANK INDEPENDENCE AND ACCOUNTABILITY

Variables	Weight	Numerical code
1. CENTRAL BANK OBJECTIVE	2.0	
a. Preserving price stability is the single objective. If more than one conflicting objective, price stability has priority;		1.0
b. Multiple conflicting objectives without establishing that preventing price stability has priority;		0.5
c. Multiple objectives, including growth, an orderly development, or economic development, without priorities.		0.0
2. APPOINTMENT AND TERM OF OFFICE OF THE MEMBERS OF THE CENTRAL BANK BOARD	2.0	
a. Nominated (appointed) by government and appointed (confirmed) by congress. Term in office exceeds or overlap government period;		1.0
b. Nominated and appointed in a two-step process for same term in office than government without overlap, or directly for longer period;		0.5
c. Nominated directly by the government for the same or shorter period than the government.		0.0
3. STRUCTURE OF CENTRAL BANK BOARD	2.0	
a. No Private sector and government representatives, except Minister of Finance without vote;		1.0
b. Direct government representation, including Minister of Finance with vote;		0.5
c. Direct government plus private sector representatives (bankers, entrepreneurs, etc).		0.0
4. REMOVAL OF BOARD MEMBERS	2.0	
a. Two-step process with qualified majority under strictly legal grounds. Final decision by Congress or Judicial Court;		1.0
b. Directly by the Executive branch under strictly legal grounds, or in two-step process under non-legal basis;		0.5
c. Removal by the Executive branch for subjective or political-not legal-ground, or by the private sector.		0.0

TABLE 1 (continued)

Variables	Weight	Numerical code
5. CENTRAL BANK CREDIT TO GOVERNMENT	3.0	
a. No direct credit, except in clearly regulated emergency situations. Or through the secondary market, with limitations;		1.0
b. Direct credit with limits, via secondary market without limits, though overdrafts, or indirectly via public banks;		0.5
c. Direct or indirect credit without limits.		0.0
6. LENDER-OF-LAST-RESORT	2.0	
a. Emergency loans legally regulated, including limits to the amount to be granted;		1.0
b. Emergency loans legally regulated, without limits to the amount;		0.5
c. Discretionary policy for emergency loans and provisions for bank resolution.		0.0
7. INSTRUMENTS INDEPENDENCE IN THE CONDUCT OF MONETARY POLICY	3.0	
a. Total independence in the use of monetary policy instruments.		1.0
b. Government involvement in formulation of monetary and exchange rate policy.		0.5
c. Limitation on the use of monetary instruments (reserve requirement, interest rate).		0.0
8. FINANCIAL INDEPENDENCE	1.0	
a. Government assures central bank capital integrity. Central bank transfers profits to the government after proper provisioning;		1.0
b. Government not required to assure integrity of central bank capital. External approval of central bank budget;		0.5
c. Central bank conducts quasi-fiscal operations. No government capitalization required.		0.0
9. ACCOUNTABILITY	1.0	
a. Central bank governor appears before the congress and reports to government. Report disclosed on timely basis;		1.0
b. Reports only to the government on a regular basis or when there are monetary disturbances, plus an annual report;		0.5
c. Central bank only publishes an annual report.		0.0
10. TRANSPARENCY AND DISCLOSURE OF FINANCIAL STATEMENT	1.0	
a. Publishes periodically financial statements certified by an external auditor;		1.0
b. Publishes financial statements with the approval of a public auditor;		0.5
c. Inappropriate accounting procedures. Publishes financial statements with the seal of the internal auditor.		0.0

Source: Jacome 2001.

As shown in table 1, the above five main categories are defined in terms of ten subcategories in order for better identification and quantification. No subcategories are assigned to the objective and the financial independent categories, which are labeled 1 and 8 respectively. The political independence category is assigned subcategories 2, 3 and 4. Subcategories 5, 6 and 7 are assigned to the economic independence category and subcategories 9 and 10 are assigned to the accountability and transparency category. Each of the ten subcategories are assigned 1, 0.5 and 0 values depending on how much each contributes to the assigned category and the overall legal independence and accountability of a central bank. In addition, the five main categories contribute differently to the legal independence and accountability index, which is why they are assigned three different weights, 1, 2 and 3, with higher weight assigned to the category that contributes to a higher degree of central bank independence and provides a more effective policy in reducing inflation. Weight 3 is assigned to instrument independence and to the limitation of government finance deficit. The central bank's objective, the subcategories of political independence and the lender of last resort provision are assigned weight 2, while the rest of the subcategories in table 1 are assigned weight 1. It is important to note that these weights are not objective, as Jacome (2001) did not provide any justifications or explanations for such weights. Given the considered weights, the highest possible independence measure is nineteen and the higher the index, the more independent the central bank.

Table 2 presents the obtained legal central bank independence and accountability indices for the fourteen ESCWA countries, as derived from central bank charters and their amendments for the four decades: 1970-1979, 1980-1989, 1990-1999 and 2000-2009. Amendments to central bank laws are rare, which explains the equal legal measures for different decades in the same country. When an amendment occurs within a given decade, we consider the charter that was in effect during at least half of the relevant decade. When a central bank was established within a given decade, a legal measure is obtained based on the specific charter only if it was practiced for at least three years during that decade. As such, the amendments that took place in Bahrain, Qatar and the Sudan after 2006 are not considered in this study. We were not able to obtain all the legislative amendments for Qatar and the Sudan, which resulted in missing the legal measures for 1970-1979 and 1980-1989 decades for Qatar and the three decades between 1970 and 1999 for the Sudan.

Table 3 presents the ranking of ESCWA central banks according to their degrees of legal and accountability measures from 2000 to 2009. Iraq has the most legal independent and accountable central bank in the oil exporter countries with an index equal to 12, while Qatar has the lowest independent and accountable central bank in the same group. In the oil importer countries, the Moroccan central bank is ranked in the first place while the Syrian central bank is ranked as the least independent central bank. In the last decade, the central banks in the oil exporter countries enjoyed a higher degree of legal independence than their oil importer counterparts. The average legal independence index in our entire sample of the ESCWA member countries is equal to 7.93. This is a low level of legal independence especially if we compare it to the 12.89 average central banks' legal independence in Latin America during the 1990s (Jacome 2001).

Table 2: Disaggregated and Aggregated Legal Central Bank Independence and Accountability Variables in the ESCWA Countries

Country and Decade	Disaggregated Legal and Accountability Variables										Aggregated Central Bank Legal Independence and Accountability Index (Maximum Score = 19)
	Central Bank Objective	Political Independence			Economic Independence			Financial Independence	Accountability & Transparency		
		Appointment and Term of Office of the Members of Central Bank Board	Structure of Central Bank Board	Removal of Board Members	Central Bank Credit to Government	Lender-of-Last-Resort	Instruments Independence in the Conduct of Monetary Policy		Accountability	Transparency and Disclosure of Financial Statement	
<b><i>Oil Exporters</i></b>											
<b>Bahrain</b>											
1970-1979	0.5	0.0	0.5	0.5	0.5	0.0	0.5	0.5	0.0	0.5	7.0
1980-1989	0.5	0.0	0.5	0.5	0.5	0.0	0.5	0.5	0.0	0.5	7.0
1990-1999	0.5	0.0	0.5	0.5	0.5	0.0	0.5	0.5	0.0	0.5	7.0
2000-2009	0.5	0.0	0.5	0.5	0.5	0.0	0.5	0.5	0.0	0.5	7.0
<b>Iraq</b>											
1970-1979	0.5	0.0	1.0	1.0	0.5	0.5	0.5	0.5	0.0	0.5	10.0
1980-1989	0.0	0.0	0.5	1.0	0.5	0.0	0.5	0.5	0.0	0.5	7.0
<b>Kuwait</b>											
1970-1979	0.0	0.0	0.5	0.5	0.5	0.0	0.5	1.0	0.0	0.5	6.5
1980-1989	0.0	0.0	0.5	0.5	0.5	0.0	0.5	1.0	0.0	0.5	6.5
1990-1999	0.0	0.0	0.5	0.5	0.5	0.0	0.5	1.0	0.0	0.5	6.5
2000-2009	0.0	0.0	0.5	0.5	0.5	0.0	0.5	1.0	0.0	0.5	6.5
<b>Kuwait</b>											
1970-1979	0.0	0.0	0.5	0.5	0.5	0.0	0.5	1.0	0.0	0.5	6.5
1980-1989	0.0	0.0	0.5	0.5	0.5	0.0	0.5	1.0	0.0	0.5	6.5
1990-1999	0.0	0.0	0.5	0.5	0.5	0.0	0.5	1.0	0.0	0.5	6.5
2000-2009	0.0	0.0	0.5	0.5	0.5	0.0	0.5	1.0	0.0	0.5	6.5
<b>Oman</b>											
1970-1979	0.0	0.0	0.5	0.5	0.5	0.5	0.5	1.0	0.0	1.0	8.0
1980-1989	0.0	0.0	0.5	0.5	0.5	0.5	0.5	1.0	0.0	1.0	8.0
1990-1999	0.0	0.0	0.5	0.5	0.5	0.5	0.5	1.0	0.0	1.0	8.0
2000-2009	0.0	0.0	0.5	0.5	0.5	1.0	0.5	1.0	0.0	1.0	9.0
<b>Qatar</b>											
1990-1999	0.5	0.0	0.5	0.5	0.0	0.0	0.5	1.0	0.0	0.5	6.0
2000-2009	0.5	0.0	0.5	0.5	0.0	0.0	0.5	1.0	0.0	0.5	6.0
<b>KSA</b>											
1970-1979	0.5	0.0	1.0	0.0	1.0	1.0	0.5	0.0	0.0	0.5	10.0
1980-1989	0.5	0.0	1.0	0.0	1.0	1.0	0.5	0.0	0.0	0.5	10.0
1990-1999	0.5	0.0	1.0	0.0	1.0	1.0	0.5	0.0	0.0	0.5	10.0
2000-2009	0.5	0.0	1.0	0.0	1.0	1.0	0.5	0.0	0.0	0.5	10.0
<b>Sudan</b>											
2000-2009	0.0	0.0	0.5	0.5	0.5	0.0	0.5	0.5	0.0	0.5	6.0

Table 2: Disaggregated and Aggregated Legal Central Bank Independence and Accountability Variables in the ESCWA Countries (Continue)

Country and Decade	Disaggregated Legal and Accountability Variables										Aggregated Central Bank Legal Independence and Accountability Index (Maximum Score = 19)
	Central Bank Objective	Political Independence			Economic Independence			Financial Independence	Accountability & Transparency		
		Appointment and Term of Office of the Members of Central Bank Board	Structure of Central Bank Board	Removal of Board Members	Central Bank Credit to Government	Lender-of-Last-Resort	Instruments Independence in the Conduct of Monetary Policy		Accountability	Transparency and Disclosure of Financial Statement	
<b>UAE</b>											
1980-1989	0.0	0.0	1.0	0.5	0.5	0.0	0.5	1.0	0.5	1.0	8.5
1990-1999	0.0	0.0	1.0	0.5	0.5	0.0	0.5	1.0	0.5	1.0	8.5
2000-2009	0.0	0.0	1.0	0.5	0.5	0.0	0.5	1.0	0.5	1.0	8.5
<b>Yemen</b>											
1990-1999	0.5	0.0	0.5	0.5	0.5	0.5	0.5	1.0	0.0	0.5	8.5
2000-2009	1.0	0.0	0.5	0.5	0.5	0.5	0.5	1.0	0.5	0.5	10.0
<b>Oil Importers</b>											
<b>Egypt</b>											
1970-1979	0.0	0.0	0.5	1.0	0.5	0.0	0.5	0.5	0.0	0.5	7.0
1980-1989	0.0	0.0	0.0	1.0	0.5	0.0	0.5	0.5	0.0	0.5	6.0
1990-1999	0.0	0.0	0.0	1.0	0.5	0.0	0.5	0.5	0.0	0.5	6.0
2000-2009	0.5	0.0	0.0	1.0	0.5	0.0	0.5	0.5	0.5	0.5	7.5
<b>Jordan</b>											
1970-1979	1.0	0.0	1.0	0.5	0.5	0.5	0.5	1.0	0.0	1.0	11.0
1980-1989	1.0	0.0	1.0	0.5	0.5	0.5	0.5	1.0	0.0	1.0	11.0
1990-1999	0.0	0.0	0.0	0.5	0.5	0.0	0.5	1.0	1.0	1.0	7.0
2000-2009	0.0	0.0	0.0	0.5	0.5	0.0	0.5	1.0	1.0	1.0	7.0
<b>Lebanon</b>											
1970-1979	0.5	0.0	0.5	0.5	0.5	0.0	0.5	1.0	0.5	0.0	7.5
1980-1989	0.5	0.0	0.5	0.5	0.5	0.0	0.5	1.0	0.5	0.0	7.5
1990-1999	0.5	0.0	0.5	0.5	0.5	0.0	0.5	1.0	0.5	0.0	7.5
2000-2009	0.5	0.0	0.5	0.5	0.5	0.0	0.5	1.0	0.5	0.0	7.5
<b>Palestine</b>											
2000-2009	0.0	0.0	0.5	0.5	0.5	0.5	0.5	1.0	0.5	1.0	8.5
<b>Syria</b>											
1970-1979	0.0	0.0	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	5.0
1980-1989	0.0	0.0	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	5.0
1990-1999	0.0	0.0	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	5.0
2000-2009	0.0	0.0	0.5	0.0	0.5	0.0	0.5	0.5	0.5	0.5	5.5

Table 3 also exhibits the indices of the five main criteria during the 2000-2009 decade for oil exporter and oil importer countries. These indices are obtained by calculating the averages of the associated subcategories. For example, the economic independence index is obtained by calculating the average of the following three subcategories central bank credit to government, lender of last resort and instrument independence. The oil exporter countries scored better in the political, economic and financial indices, while the oil importer countries scored better in the objective and accountability indices.

TABLE 3. RANKING CENTRAL BANKS LEGAL INDEPENDENCE INDEX, 2000-2009

Country	Objective	Political independence		Economic independence	Financial independence	Accountability and transparency
<i>Oil exporters</i>						
Iraq	0.50	0.67	0.50	1.00	0.75	12.0
Saudi Arabia	0.50	0.33	0.83	0.00	0.25	10.0
Yemen	1.00	0.33	0.50	1.00	0.50	10.0
Oman	0.00	0.33	0.67	1.00	0.50	9.0
United Arab Emirates	0.00	0.50	0.33	1.00	0.75	8.5
Bahrain	0.50	0.33	0.33	0.50	0.25	7.0
Kuwait	0.00	0.33	0.33	1.00	0.25	6.5
Qatar	0.50	0.33	0.17	1.00	0.25	6.0
The Sudan	0.00	0.33	0.33	0.50	0.25	6.0
Average	0.33	0.39	0.44	0.78	0.42	8.33
<i>Oil importers</i>						
Palestine	0.00	0.33	0.50	1.00	0.75	8.5
Egypt	0.50	0.33	0.33	0.50	0.50	7.5
Lebanon	0.50	0.33	0.33	1.00	0.25	7.5
Jordan	0.00	0.17	0.33	1.00	1.00	7.0
Syrian Arab Republic	0.00	0.17	0.33	0.50	0.50	5.5
Average	0.25	0.25	0.33	0.75	0.56	7.20
ESCWA Average	0.29	0.35	0.42	0.79	0.48	7.93

#### B. THE TURNOVER RATES OF CENTRAL BANK GOVERNORS (THE DE FACTO INDEX)

Cukierman et al. (1992) stated that the legal index is insufficient to capture the degree of central bank independence especially in developing countries for two main reasons. First, the legal status of the central bank might fail to explicitly specify the exact limits of authority between the central bank and the government. Such voids are often filled by tradition at best or power politics at worst. Second, even if the law exactly defines the above limits, in most cases this law is not observed and respected in real terms. Our obtained legal indices confirms this argument. However, our findings do not necessarily reflect the actual degree of central bank independence and thus, relying on such findings would present a distorted conclusion of the actual degree of central bank independence in the ESCWA region. For example, our findings show that the central bank of Yemen scored the third highest degree of independence and accountability in the entire sample. However, its inflation performance contradicts this result. Yemen suffered from high double-digit inflation rates during the 1990s and low double digits during the 2000s. On the contrary, the central banks of Bahrain, Jordan, Kuwait and Qatar scored below the average legal index, despite the fact that their economies have enjoyed a low and stable inflation rate for a long time.

The alternative de facto measure developed in this paper is the turnover rate introduced by Cukierman et al. (1992). This measure is based on the assumption that a frequent change in governor above a certain threshold would create a central bank that is less independent from the government and political interference. Central bank governors who resist their government's wills are subject to frequent firing and replacement by others who are willing to support that government's short-term agenda. A less frequent turnover of the governor would provide the opportunity for an execution of long-term strategies to contain and keep inflation both low and stable. In such a case, the governor's reputation would also insulate the central bank from political pressure and would achieve price stability.

When the governor's tenure is shorter than that of the government, it is an indication of a frequent turnover rate for the governor and a less independent central bank. Cukierman et al. (1992) suggest that the average electoral cycle should be around 4 years. Hence, it is most likely that a turnover rate above 0.25 would constitute a threshold level above which the central bank's independence and monetary policy are seriously endangered by the government's influences. However, there might be an exception to this rule. In non-democratic regimes, the central bank governors are inclined to execute less independent short-term monetary policies in order to secure their jobs. Therefore, low turnover rates would not necessarily mean higher levels of central bank independence. However, such a measure would allow us to roughly compare the independences of different central banks across the ESCWA countries and over time.

We obtained the average annual turnover rates for the fourteen ESCWA countries from 1970 to 2009 and the four decades within that period: 1970-1979, 1980-1989, 1990-1999 and 2000-2009. The rates measure the number of appointed central bank governors per year. The rate interval is between zero and one, with zero indicating the maximum possible degree of central bank independence and one indicating a central bank completely dominated by the government. A turnover rate of a decade is calculated only if three years of data are available for a specific decade otherwise a zero rate is applied. The names of previous governors and their terms in office are obtained from the Morgan Stanley Central Bank Dean Witter's Directory, the individual central banks' websites and the author's correspondence with central banks.

Table 4 presents the obtained average annual turnover rates for our three samples of countries in the specified periods. The countries are ranked according to rates for the full period, between 1970 and 2009. Accordingly, Saudi Arabia and the United Arab Emirates have the most independent central banks among oil exporter countries with turnover rates equal to 0.08 or a change every 12 years while the Sudan has the lowest independent central independence (a change every three and a half years). In the oil importers sample, Jordan revealed the lowest frequency for changing the governor of the central bank (a change every six years and 7 months) and Egypt has the highest turnover frequency (three years and six months). The average turnover rate of central bank governors is considerably lower in the oil exporter countries than that of the oil importer countries, 0.13 and 0.22 respectively. In the entire ESCWA member countries it is equal to 0.17.

TABLE 4. TURNOVER RATES OF CENTRAL BANK GOVERNORS IN THE ESCWA REGION, MAX = 1

Country	1970-1979	1980-1989	1990-1999	2000-2009	1970-2009
<i>Oil exporters</i>					
Kuwait	0.14	0.29	0.00	0.00	0.08
United Arab Emirates	0.29	0.00	0.11	0.00	0.08
Oman	0.40	0.00	0.11	0.00	0.09
Qatar	0.20	0.00	0.00	0.25	0.09
Bahrain	0.40	0.00	0.00	0.22	0.14
Saudi Arabia	0.17	0.14	0.00	0.00	0.15
Yemen	n/a	n/a	0.33	0.00	0.15
The Sudan	0.30	0.40	0.40	0.00	0.28
Average	0.27	0.12	0.12	0.06	0.13



TABLE 4 (continued)

Country	1970-1979	1980-1989	1990-1999	2000-2009	1970-2009
<i>Oil importers</i>					
Jordan	0.14	0.40	0.25	0.11	0.15
Lebanon	0.50	0.20	0.22	0.00	0.18
Syrian Arab Republic	0.22	0.33	0.20	0.20	0.25
Palestine	n/a	n/a	0.17	0.33	0.25
Egypt	0.22	0.38	0.14	0.22	0.28
Average	0.27	0.33	0.20	0.17	0.22
ESCWA Average	0.27	0.19	0.15	0.10	0.17

Sources: Morgan Stanley Central Banks Directory, central bank websites and the author's correspondence with central banks.

To test the relationship between the legal index and the turnover rates in the three samples, we obtained the pair correlation coefficients. In the three samples, the degrees of correlation are equal to -0.09, -0.080 and 0.071 in the ESCWA sample, oil exporter countries and the oil importer countries respectively. The three coefficients are significant at a one per cent confidence level. These low correlation values suggest that the actual central banks' independence in the ESCWA region are determined by factors other than the law.

TABLE 5. THE RELATIONSHIP BETWEEN THE ACTUAL AND THE LEGAL TERMS OF OFFICE

Independent variable	All ESCWA countries	Oil exporting ESCWA countries	Oil importing ESCWA countries
Intercept	0.021 (0.15)	0.008 (0.05)	0.345 (1.59)
Legal terms of office	0.017 (0.60)	0.011 (0.28)	-0.036 (-0.82)
Dummy: 1970-1979	0.171 <sup>***</sup> (2.82)	0.223 <sup>**</sup> (2.67)	0.115 (1.51)
Dummy: 1980-1989	0.109 <sup>*</sup> (1.86)	0.080 (1.01)	0.171 <sup>**</sup> (2.23)
Dummy: 1990-1999	0.045 (0.83)	0.060 (0.82)	0.032 (0.45)
R <sup>2</sup>	0.20	0.25	0.32

The Dependent Variable is the Governors' Actual Turnover Rates.

The numbers between parentheses are the t-statistics.

\*..Significant at 10 per cent Level; \*\* Significant at 5 per cent Level; and \*\*\* Significant at 1 per cent Level.

In order to find out whether the governor's legal terms of office, as specified in law, affects the actual terms in the three samples, we obtained actual turnover rates in the four decades for the governors' legal terms of office and on three dummies representing the decades of the 1970s, the 1980s and the 1990s. We expected a negative relationship between the two kinds of terms, i.e. where the legal terms of office increase, the turnover rate would decrease. The regression results in table 5 reveals that the coefficient of the legal terms has the wrong positive sign in both the cumulative sample and in the oil exporting countries, and the expected negative sign in the oil importing countries, implying that none of the coefficients are statistically significant. We conclude that the actual turnover rates in the three samples are affected by several factors other than the legal terms of office.

Cukierman (2008) presents enough evidence to suggest that most central banks in emerging countries evolved to be more independent since the 1990s, especially in Latin America, the former socialist economies and the countries that joined the European Economic and Monetary Union. Our obtained legal index and governor's turnover rates allow us to show whether or not the ESCWA central banks evolved in the last four decades to become more independent from political influences similar to their counterparts in emerging economies. Table 6 shows the evolution of the central banks' independence in the three samples of countries since the 1970s. The table also presents the average inflation rates for the same three samples and during the same time frame. In the 1980s, the average legal independence decreased in the three samples compared to levels in the 1970s. In the entire sample of the ESCWA member countries and in the oil importing countries, central bank independence continued to deteriorate throughout the 1990s, while in the oil exporting countries it remained constant over the same period. In the 2000s, the degree of independence improved in the three samples compared to the 1990s. However, compared to levels during the 1970s, the entire ESCWA sample shows a marginal improvement, an 8.5 per cent improvement in the oil importing countries, while a failure to restore the 1970s level of independence in the oil exporting countries. On the contrary, the actual turnover rates declined significantly and continuously from 1970 to 2009. Between 1970 and 2009, they dropped from 0.27 to 0.10 in the ESCWA sample (or 63 per cent), from 0.027 to 0.06 per cent in the oil exporting countries (or 78 per cent), and from 0.27 to 0.17 in the oil importing countries (or 37 per cent). As a conclusion, the amendments to central banks charters and laws since 1970 did not improve the degree of central bank independence in the ESCWA region as a whole. On the other hand, the frequencies of changing central bank governors declined remarkably with each decade since the 1970s.

TABLE 6. THE ESCWA LEGAL INDEX, THE TURNOVER RATES AND THE INFLATION, BY DECADE

	1970-1979	1980-1989	1990-1999	2000-2009
Legal independence and accountability, maximum = 19				
All ESCWA countries	7.3	7.0	6.7	7.4
Oil exporting countries	7.0	6.7	6.8	7.6
Oil importing countries	7.6	7.4	6.4	7.2
Governors' turnover rates, maximum = 1				
All ESCWA countries	0.27	0.19	0.15	0.10
Oil exporting countries	0.27	0.12	0.12	0.06
Oil importing countries	0.27	0.33	0.20	0.17
Inflation rates, in per cent				
All ESCWA countries	11.7	17.9	16.1	6.4
Oil exporting countries	12.1	9.5	16.4	7.0
Oil importing countries	10.1	35.9	13.5	4.6

#### IV. INFLATION AND CENTRAL BANK INDEPENDENCE IN THE ESCWA REGION

As highlighted in the above discussion, the ESCWA region followed the worldwide trend of a more independent monetary policy, at least as indicated by the actual independence measure. It also followed the worldwide disinflation trend of the 1990s. Table 7 shows that the inflation rate has dropped around 12 per cent in the ESCWA region, 9.4 per cent in the oil exporting countries and a staggering 31 per cent in the oil importing countries since the 1980s. The key question is whether there is a systematic relationship between disinflation and increasing central bank independence. To answer this question, we run two regressions. First, we regress the transformed inflation (T) on the five disaggregated legal variables (the five criteria we used to obtain the legal index), on the governors' turnover rates and on three dummies representing the 1970s, 1980s and 1990s decades. Second, we regress the transformed inflation (T) on the legal index, the turnover rates and the three dummies we used in the first regression. We expect the transformed inflation (T) to be inversely related to the five disaggregated legal variables and the aggregated legal variable and a positive relationship is expected with the governors' turnover rates. We run the above two regressions on the three samples of countries considered in this study.

We use the annual per cent change of consumer price indices for the fourteen ESCWA member countries in our sample from 1970 to 2009. The source used was the World Economic Outlook. A few inflation observations have three digit rates that might reduce the efficiency of the estimates by causing heteroskedasticity of the errors. To prevent this, we transform each year's inflation rate as follows:

$$T = \pi / (1 + \pi)$$

Where  $\pi$  is the inflation rate and T represents the real annual depreciation of a given amount of money.

We obtain the averages of the transformed inflation rates for each decade and use them as the dependent variables in both regressions. Table 7 presents the descriptive statistics of the variables used in both regressions and table 8 shows the correlating coefficients of the independent variables.

TABLE 7. THE DESCRIPTIVE STATISTICS OF ALL VARIABLES

Statistics	T	O	PI	EI	FI	AT	LI	TOR
Mean	0.09	0.27	0.35	0.39	0.73	0.39	7.70	0.18
Median	0.06	0.00	0.30	0.30	1.00	0.30	7.25	0.20
SD	0.09	0.31	0.12	0.17	0.33	0.23	1.69	0.15
Variance	0.01	0.10	0.01	0.03	0.11	0.05	2.86	0.02
Kurtosis	1.91	0.69	1.58	1.46	-0.80	1.07	0.68	0.21
N	6.75	2.50	4.97	4.04	2.55	4.19	2.68	1.96
Sum	48	44	44	44	44	44	44	50
Range	4.28	12.00	15.30	17.20	32.00	17.30	339.00	8.93
Min	0.41	1.00	0.50	0.60	1.00	1.00	7.00	0.50
Max	0.00	0.00	0.20	0.20	0.00	0.00	5.00	0.00
	0.41	1.00	0.70	0.80	1.00	1.00	12.00	0.50

T: Transformed Inflation Rates; O: Objective; PI: Political Independence; EI: Economic Independence; FI: Financial Independence; AT: Accountability and Transparency; LI: Legal Index; and TOR: Turnover Rates.

TABLE 8. CORRELATIONS COEFFICIENTS AND T-STATISTICS BETWEEN INDEPENDENT VARIABLES

Correlation t-statistic	O	PI	EI	FI	AT	LI	TOR
O	1 -----						
PI	0.18 1.20	1 -----					
EI	0.32** 2.17	0.07 0.44	1 -----				
FI	-0.05 -0.33	0.05 0.33	-0.50*** -3.70	1 -----			
AT	-0.05 -0.35	0.08 0.55	0.04 0.24	0.47*** 3.44	1 -----		
LI	0.59*** 4.78	0.53*** 4.00	0.72*** 6.73	-0.02 -0.15	0.40*** 2.79	1 -----	
TOR	0.07 0.47	0.10 0.66	-0.15 -0.96	-0.01 -0.04	-0.18 -1.17	-0.09 -0.55	1 -----

O: Objective; PI: Political Independence; EI: Economic Independence; FI: Financial Independence; AT: Accountability and Transparency; LI: Legal Index; TOR: Turnover Rates; \*\*: Significant at 5 per cent Level; and \*\*\*: Significant at 1 per cent Level.

Table 9 presents the results of the first regression. In the regressions of the entire sample and the oil exporting sample, the intercepts are negative and statistically insignificant. All the coefficients of the disaggregated legal variables have the wrong positive sign except the accountability and transparency variable and none of them is statistically significant. The coefficients of the turnover rates have the right positive signs but only that of the entire sample is statistically significant at the 5 per cent confidence level. The three coefficients of the dummy variables are statistically insignificant and the  $R^2$  are equal to 0.29 and 0.42. In the regression of the oil importing sample, the intercept is positive and statistically significant at the 1 per cent confidence level. The coefficients of the objective and the accountability and transparency variable have the wrong positive signs, while the coefficients of the political and the financial independence variables have the correct negative signs but are statistically insignificant. On the other hand, the coefficient of the economic independence variable has the right negative sign and is statistically insignificant, while the coefficient of the actual turnover rates has the wrong negative sign. The coefficients of the three dummies are statistically significant and the  $R^2$  is equal to 0.86.

Table 8 reveals significant collinearity between the objective and economic independence, the financial independence and the economic independence and the accountability and the financial independence disaggregate legal variables. The presence of such collinearity between the independent variables inflates their corresponding standard errors, which in turn affects the precision of our estimations and our ability to draw conclusions. That is why we need to carry out a second regression with the aggregate legal variable and the governors' turnover rates.

TABLE 9. THE RELATIONSHIPS BETWEEN THE TRANSFORMED INFLATION (T) AND THE ESCWA CENTRAL BANK INDEPENDENCE (DISAGGREGATED LEGAL VARIABLE AND ACTUAL TURNOVER RATES), 1970-2009

Independent variable	All ESCWA countries	Oil exporting ESCWA countries	Oil importing ESCWA countries
Intercept	-0.001 (-0.13)	-0.094 (-1.16)	0.634 <sup>***</sup> (3.46)
Objective	0.027 (0.72)	0.060 (1.33)	0.300 <sup>**</sup> (2.74)
Political independence	0.049 (0.44)	0.093 (0.63)	-0.359 (-1.25)
Economic independence	0.015 (0.18)	0.081 (1.00)	-1.41 <sup>***</sup> (-3.05)
Financial independence	0.062 (1.38)	0.083 (1.59)	-0.192 (-1.57)
Account.and transp.	-0.075 (-1.33)	-0.028 (-0.29)	0.127 (1.36)
Actual turnover rates	0.190 <sup>**</sup> (2.18)	0.129 (1.23)	-0.385 <sup>**</sup> (-2.43)
Dummy: 1970-1979	-0.017 (0.47)	0.001 (0.02)	0.213 <sup>**</sup> (3.03)
Dummy: 1980-1989	0.015 (0.47)	-0.023 (-0.74)	0.313 <sup>***</sup> (4.49)
Dummy: 1990-1999	0.010 (0.37)	0.004 (0.13)	0.153 <sup>**</sup> (3.11)
$R^2$	0.29	0.42	0.86

The Dependent Variable is the Transformed Inflation Rates (T).

The numbers between parentheses are the t-statistics.

\*: Significant at 10 per cent Level; \*\*: Significant at 5 per cent Level; and \*\*\*: Significant at 1 per cent Level.

The results of the second regression are presented in table 10. The coefficients of the legal variable have the expected negative sign and are statistically significant at the 5 per cent confidence level in both the full and oil importing samples. However, it has the wrong positive sign and is statistically insignificant in the oil exporting sample. The coefficients of the turnover rates have the expected positive sign in the three samples, but they are statistically significant only in both the full and oil exporting samples. The intercepts of the full and oil importing sample are statistically significant, while those of the oil exporting countries are statistically insignificant. The correlations between the two independence measures in the three regressions are insignificant as shown before. Therefore, the three regressions have no serious multi collinearity. The  $R^2$  of the full, oil exporting and oil importing regressions are equal to 0.41, 0.31 and 0.84 respectively.

TABLE 10. THE RELATIONSHIPS BETWEEN THE TRANSFORMED INFLATION (T) AND THE ESCWA CENTRAL BANK INDEPENDENCE (AGGREGATED LEGAL VARIABLE AND ACTUAL TURNOVER RATES), 1970-2009

Independent variable	All ESCWA countries	Oil exporting ESCWA countries	Oil importing ESCWA countries
Intercept	0.093 (3.18)	-0.019 (-0.33)	0.130 (4.07)
Legal independence	-0.008** (-2.15)	0.008 (1.20)	-0.015** (-3.36)
Actual turnover rates	0.113** (2.49)	0.195** (2.10)	0.098 (1.29)
Dummy: 1970-1979	0.008 (0.45)	-0.022 (-0.61)	0.026 (1.17)
Dummy: 1980-1989	0.008* (0.51)	-0.037 (-1.24)	0.074*** (3.00)
Dummy: 1990-1999	-0.007 (-0.49)	0.002 (0.09)	0.014 (0.75)
$R^2$	0.41	0.31	0.84

The Dependent Variable is the Transformed Inflation Rates (T).

The numbers between parentheses are the t-statistics.

\*: Significant at 10 per cent Level; \*\*: Significant at 5 per cent Level; and \*\*\*: Significant at 1 per cent Level.

The relationship between inflation and central bank independence has been challenged by several scholars (Forder, 1998; Hayo, 1998; Hayo & Hefeker, 2001; Daunfeld & Luna, 2001). According to the literature, the relationship could carry a two-way causality where a more independent central bank would be less immune from political pressure to pursue short-term monetary policy that would negatively affect inflation. It is also true that in a high inflation environment, central banks become less independent. According to Cukierman et. al. (1992), it would be easier for governments to influence monetary policy in a high inflation environment without changing a central bank's legal charter. The general public usually blames the central bank for high inflation rates, which weakens its public image and its position in relation to the treasury. It is important to note that a central banks' legal charter changes by amendments and are not determined by inflation factors. Instead, inflation would have an effect on the actual central bank independence level, which we measured in this study through the governor turnover rates.

To test whether we have a two-way causality, we run the Granger-Causality test on the transformed inflation (T) and the actual turnover rates (TOR). We test the following two null hypotheses:

First Hypothesis: T does not Granger cause TOR.

TABLE 11. GRANGER-CAUSALITY TEST RESULTS, NUMBER OF LAGS = 1, 2 AND 3

No. of Lags	Null Hypothesis	F-Statistics	Prob.
1	TOR does not Granger Cause T	3.880	0.05
	T does not Granger Cause TOR	0.451	0.50
2	TOR does not Granger Cause T	1.720	0.19
	T does not Granger Cause TOR	0.465	0.63
3	TOR does not Granger Cause T	1.321	0.28
	T does not Granger Cause TOR	0.507	0.68

Second Hypothesis: TOR does not Granger cause T.

Table 11 reveals that we can reject the first hypothesis at 5 per cent and cannot reject the second hypothesis when taking the number of lags equal to one. Also, we cannot reject both hypotheses when taking the number of lags equal to two and three. Thus, the causal relationship between inflation and central bank independence is a one-way causality. Central bank independence affects inflation though not vice versa only when the number of lags is equal to one. This conclusion assures us that the results we obtained in table 11 reflect a true relationship between inflation and central bank independence.

Therefore, legal independence is negatively related to inflation in the oil importing countries but not in the oil exporting countries. On the contrary, the actual turnover rate is positively related to inflation in the oil exporting countries but not in the oil importing countries. Both the legal independence and the actual turnover rate seem to explain the variation of inflation over time for the entire sample of the ESCWA member countries.

#### V. INFLATION VOLATILITY AND CENTRAL BANK INDEPENDENCE IN THE ESCWA REGION

The other important aspect we should explore in this paper is the relationship between central bank independence and inflation. High inflation volatility can be as costly to the economy as high inflation levels. Higher volatility over time can increase the uncertainty of future prices that could seriously hinder growth and societal welfare. The literature provides several explanations of why inflation volatility is negatively related to central bank independence. Alesina (1988 and 1989) argued that inflation is affected by the different political agendas of the different parties in power. A left wing government will pursue expansionary policies while a right wing government will fight inflation. The different agendas aimed to please the different political factions would lead to volatility in the inflation rate. An independent central bank would decrease this volatility, since its policies would not be dictated by the political parties currently in power. Another explanation is provided by Friedman (1977), where he suggested that governments manipulate unemployment and output in the short term, which is possible only in the presence of a dependent central bank. Once economic agents realize the inflation outcome of such policies, there would be political pressure to reduce the money supply that in turn results in inflation volatility.

TABLE 12. THE RELATIONSHIPS BETWEEN THE STANDARD DEVIATION OF THE TRANSFORMED INFLATION AND THE CENTRAL BANK INDEPENDENCE (AGGREGATED LEGAL VARIABLE AND TURNOVER RATES), 1970-2009

Independent variable	All ESCWA countries	Oil exporting ESCWA countries	Oil importing ESCWA countries
Intercept	0.021 (0.74)	0.012 (0.33)	0.059 <sup>****</sup> (3.71)
Legal independence index	-0.001 (-0.16)	0.001 (0.39)	-0.004 <sup>**</sup> (-2.16)
Governors' turnover rates	0.119 <sup>***</sup> (2.80)	0.115 <sup>**</sup> (2.20)	0.069 <sup>*</sup> (1.91)

TABLE 12 (continued)

Independent variable	All ESCWA countries	Oil exporting ESCWA countries	Oil importing ESCWA countries
Dummy: 1970-1979	-0.018 (-1.01)	-0.028 (-1.25)	0.004 (0.41)
Dummy: 1980-1989	-0.003 (-0.20)	-0.002 (-0.10)	0.029** (2.11)
Dummy: 1990-1999	0.016 (1.17)	0.003 (0.22)	0.004 (0.37)
R <sup>2</sup>	0.26	0.24	0.77

The Dependent Variable is the Standard Deviation of the Transformed Inflation Rates (T).

The numbers between parentheses are the t-statistics.

\*: Significant at 10 per cent Level; \*\*: Significant at 5 per cent Level; and \*\*\*: Significant at 1 per cent Level.

To establish the relationship between central bank independence and inflation volatility in the ESCWA region, we regress the standard deviation of the transformed inflation (T) on the legal independence index, the actual turnover rates and the three dummies used previously. We expect the inflation volatility to be negatively related to the aggregated legal variable and positively related to the actual turnover rates. The regression results are listed in table 12. The coefficient of the legal index has the expected negative sign and is statistically significant in the oil importing sample. It also shows the right sign but is statistically insignificant in the full sample and the wrong positive sign is statistically insignificant in the oil exporting countries. The coefficients of the TOR have the right positive sign and are statistically significant at 1 per cent, 5 per cent and 10 per cent confidence levels in the full, oil exporting and oil importing samples respectively. Only one dummy coefficient is statistically significant. The intercepts of the full and the oil exporting samples are statistically insignificant and those of the oil importing sample are particularly significant. The independent variables explain 26 per cent, 24 per cent and 77 per cent of the standard deviation of (T) in the full, oil exporting and oil importing samples respectively.

## **VI. RECOMMENDATIONS TO ENHANCE CENTRAL BANKS LEGAL INDEPENDENCE IN THE ESCWA REGION**

We can use table 13 to evaluate the central banks of the different ESCWA member countries according to the subcategories considered in this study. Such a grouping allows us to diagnose the criteria that contribute to low degree of central bank independences in ESCWA member countries. To grant ESCWA central banks greater independence from governments and political influences, the legal charters should address the weaknesses displayed in table 14. The objectives of the ESCWA central banks should be more focused on achieving price stability as a key determinant for better inflation performances in the region. This has been an important issue since 2000 to 2009, where the average score of the objectives in our sample was equal to 0.29, the lowest average among the main five criteria as shown in table 3. In the same period, between 2000 and 2009, only Yemen aimed for price stability as either a single objective or a priority over other objectives. Seven countries in our sample received zero weights for having multiple objectives without giving priority to price stability as a primary central bank objective.

TABLE 13. ESCWA CENTRAL BANK INDEPENDENCE EVALUATION AND GROUPING, 2000-2009

Criteria (weight)	1	0.5	0
1. Central Bank Objective (2)	Yemen.	Bahrain, Egypt, Iraq, Lebanon, Qatar and Saudi Arabia.	Jordan, Kuwait, Oman, Palestine, the Sudan, Syrian Arab Republic and the United Arab Emirates.
2. Appointment and Term of Office of the Members of the Central Bank Board (2)		Iraq.	Bahrain, Egypt, Jordan, Kuwait, Lebanon, Oman, Palestine, Qatar, Saudi Arabia, the Sudan, Syrian Arab Republic, United Arab Emirates and Yemen.
3. Structure of Central Bank Board (2)	Iraq, Saudi Arabia and United Arab Emirates.	Bahrain, Kuwait, Lebanon, Oman, Palestine, Qatar, the Sudan, Syrian Arab Republic and Yemen.	Egypt and Jordan.
4. Removal of Board Members (2)	Egypt.	Bahrain, Iraq, Jordan, Kuwait, Lebanon, Oman, Palestine, Qatar, the Sudan, the United Arab Emirates and Yemen.	Saudi Arabia and Syrian Arab Republic.
5. Central bank Credit to Government (3)	Saudi Arabia.	Bahrain, Egypt, Iraq, Jordan, Kuwait, Lebanon, Oman, Palestine, the Sudan, Syria, United Arab Emirates and Yemen.	Qatar.
6. Lender-of-Last-Resort (2)	Oman, the Sudan and Saudi Arabia.	Palestine and Yemen.	Bahrain, Egypt, Jordan, Kuwait, Iraq, Lebanon, Qatar, the Sudan, Syrian Arab Republic and United Arab Emirates.
7. Instruments Independence in the Conduct of Monetary Policy (3)	Iraq.	Bahrain, Egypt, Jordan, Kuwait, Lebanon, Oman, Palestine, Qatar, Saudi Arabia, the Sudan, Syrian Arab Republic, United Arab Emirates and Yemen.	
8. Financial Independence (1)	Iraq, Jordan, Kuwait, Lebanon, Oman, Palestine, Qatar, the United Arab Emirates and Yemen.	Bahrain, Egypt, the Sudan and Syrian Arab Republic.	Saudi Arabia.
9. Accountability (1)	Jordan.	Egypt, Iraq, Lebanon, Palestine, Syrian Arab Republic, United Arab Emirates and Yemen.	Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the Sudan.
10. Transparency and Disclosure of Financial Statement (1)	Iraq, Jordan, Oman, Palestine and United Arab Emirates.	Bahrain, Egypt, Kuwait, Qatar, Saudi Arabia, the Sudan, Syrian Arab Republic and Yemen.	Lebanon.



The average political independence enjoyed by the ESCWA central banks in the 2000s was the second lowest as shown in table 3 with a value equal to 0.35. Table 14 reveals that the two subcategories, the appointment procedure of the board members and the removal from office criteria, are responsible for such low levels of political independence. The procedure of appointing central bank board members is a serious factor towards weak central bank legal independence in the ESCWA region. The best practice as recommended by the IMF is the procedure whereby the board members are nominated by the government and confirmed by the legislative branch for terms in office exceeding or overlapping with the government's period. In the ESCWA region, with the exception of Iraq, all central bank board members are appointed exclusively by the executive branch and no role is given to the legislative branch in the process. The involvement of the legislature branch in appointing board members in the ESCWA region would make boards more immune to resist political pressures and to independently practice their roles. Another related process responsible for weak political independence in the ESCWA region that requires the involvement of the legislative branch is the removal of the board members from office. Such involvements would limit the firing of board members by the executive branch for not pursuing the government's economic agenda. In Egypt, there is no provision in the central bank's charter for dismissing the board members and it received a full score regarding this criterion. In Bahrain, Iraq, Kuwait, Jordan, Lebanon, Oman, Palestine, Qatar, the Sudan, United Arab Emirates and Yemen, the executive branch directly dismisses the board members on strictly legal grounds. In Saudi Arabia and the Syrian Arab Republic, the executive branch can directly dismiss the board members on subjective, political and non-legal grounds.

The economic independence subcategories shown in table 14 reveal major weaknesses that seriously affect the region's central bank independence. Most ESCWA member countries impose limits on the government's direct finance from the central bank. Only Saudi Arabia's central bank is not given legal authority to lend the government any direct credit as it abides by the Islamic laws, while Qatar's government has unlimited access to its central bank's credit. More ESCWA member countries should follow Saudi Arabia's example since allowing a government to finance its deficit from the central bank would encourage inefficient spending, recurring public deficits and unsustainable levels of public debt. ESCWA central banks should act as lenders of last resort, providing emergency loans to the banking system but under two strict conditions, loans should be limited and legally regulated. In our ESCWA sample, the Saudi Arabia central bank does not provide any loans or advances to any private sector, while Oman is the only ESCWA country that provides emergency, limited and legally regulated loans to its banking sector. Yemen provides unlimited but regulated loans to its government. The other eleven central banks in our sample act as lender of last resort according to the terms and conditions determined by their boards. The ESCWA region's central banks need to reform their laws by setting limits and legal regulation for loans that banks could have in emergency situations. Such changes would result in more effective and sound financial markets and would ensure that financial institutions have equal access to a central bank's credit according to clearly stated laws.

Accountability is another subcategory that ESCWA countries receive low scores on and which contributes to the overall low degree of central bank independence in the region. Only the governor of the central bank of Jordan appears before the legislative branch to report on monetary disturbances and submits an annual report to the government. The central banks of Egypt, Iraq, Lebanon, Syrian Arab Republic, United Arab Emirates and Yemen periodically submit monetary reports to the executive branches and the rest of the countries in our sample only submit such reports annually. Future amendments to these central banks' charters should make the central banks more accountable not only to the executive branches but also to the legislative ones. Such changes would make central banks more responsible to deliver sound monetary policies and to achieve their objectives more effectively.

Finally, the transparency criterion shows that only the Lebanon's central bank publishes periodical financial statements that are certified by an external auditor, while the central banks of Bahrain, Egypt, Kuwait, Qatar, Saudi Arabia, the Sudan, Syrian Arab Republic and Yemen publish financial statements certified by a public sector auditor. In contrast, the central banks of Iraq, Jordan, Oman, Palestine and the

United Arab Emirates prepare their financial statements using inappropriate accounting procedures that are not approved by an internal auditor.

We can use tables 2 and 14 to recommend amendments to the legally weak provisions in the central bank laws. The criteria that scored zero in table 2 are the weakest and are the ones that mainly contribute to a low degree of central bank independence in the region. We recommend that individual countries amend their central bank laws, specifically the corresponding provisions that scored zero, in order to raise their scores to 0.5. Table 14 shows the improvement in central bank's independence on the country, sub-regional (oil and non-oil countries) and regional levels and that could be gleaned by following our recommendation. The degree of independence of the Syrian, Qatari, Sudanese, Jordanian and Kuwaiti central banks would improve 73 per cent, 67 per cent, 58 per cent, 57 per cent and 54 per cent respectively. Legal independence would remarkably improve as well. Overall, the degree of central bank independence would be improved by 32 per cent (11 compared to 8.3), 43 per cent (10.3 compared to 7.2) and 36 per cent (10.5 compared to 7.7) in the oil exporting countries, the oil importing countries and the entire ESCWA countries respectively.

TABLE 14. THE IMPROVEMENTS IN LEGAL INDEPENDENCES RESULTING FROM AMENDING THE WEAK PROVISIONS

Countries	Current CBI	Improved CBI	Percentage improvement
Oil exporting countries			
Bahrain	7.0	9.5	35.7
Iraq	12.0	13.0	8.3
Kuwait	6.5	10.0	53.8
Oman	9.0	11.5	27.8
Qatar	6.0	10.0	66.7
Saudi Arabia	10.0	13.0	30.0
The Sudan	6.0	9.5	58.3
United Arab Emirates	8.5	11.5	35.3
Yemen	10.0	11.0	10.0
Average	8.3	11.0	32.0
Oil importing countries			
Egypt	7.5	10.5	40.0
Jordan	7.0	11.0	57.1
Lebanon	7.5	10.0	33.3
Palestine	8.5	10.5	23.5
Syrian Arab Republic	5.5	9.5	72.7
Average	7.2	10.3	43
ESCWA average	7.7	10.5	35.6

## VII. CONCLUSION

In this paper we measured the central bank independence for the entire fourteen ESCWA member countries using two indicators: the legal independence and the accountability measure (the de jure measure) derived from the central banks laws, and the actual turnover rate (the de facto measure) measuring the change of central bank governors per year. According to our measured legal index, the central banks of Iraq and the Sudan are the most and least independent central banks respectively among the oil exporting countries, scoring 12.0 and 6.0 (out of 19) respectively. In the sample of the oil importing countries, Palestine and the Syrian Arab Republic are the most and the least independent central banks, scoring 8.5 and 5.5 respectively. The average of the legal index is 8.3, 7.2 and 7.9 for the oil exporting, oil importing and the entire ESCWA member countries in the sample. The obtained actual measure for the oil exporting countries

indicates that the central banks of Kuwait and Jordan have the lowest frequencies of changing governors in the oil exporting and the oil importing countries respectively with a change every 12.5 years and a change every 6.7 years respectively. The Sudan and Egypt have the highest frequencies of changing governors in the oil exporting and the oil importing samples respectively with a change every 3.6 years in both countries. The average frequency of changing a central banks governor is equal to 7.7, 4.5 and 5.9 years in the oil exporting, oil importing and the entire sample of ESCWA countries respectively. The obtained turnover rate measures show that the degree of actual central bank independence increased remarkably since the 1980s. However, the legal measure does not confirm this conclusion. Our study demonstrates that a central bank's governor's actual term in office is affected by several factors other than the legal terms of office.

This paper used the obtained legal and turnover rate measures to explore their effects on the level and the volatility of inflation rates. The data covers the four decades from 1970 to 2009. Our regression analysis confirms that both measures of central bank independence contribute to lower levels of inflation rates when considering the sample of the entire ESCWA countries. In the oil exporting countries the turnover rate measure, and not the legal measure, plays a significant role to lower the level of inflation rates. On the contrary, the legal measure, and not the turnover rate measure, plays a significant role to lower the levels of inflation rates in the oil importing countries.

As for the effect of both measures on the volatility of inflation rates, the turnover rate measure contributes to lowering the volatility of inflation rates in the sample of the entire ESCWA countries where as the legal measure has no such role. In the oil exporting countries, the turnover rate measure, and not the legal measure, contributes to lower inflation volatility in the oil exporting countries, while both measures seem to lower inflation volatility in the oil importing countries.

Finally, we analysed the disaggregated variables that constitute the legal measure (to pinpoint the legal weakness) and that contribute to low degrees of central bank independence in the ESCWA region. The objective and political independence are the major weak variables whereas the financial independence variable received the highest score among the other variables. Our study recommends specific amendments to address the legally weak provisions in central bank legislation for a better inflation performance in the region. The proposed amendments would increase the degree of legal independence by 36 per cent, 32 per cent and 43 per cent for the entire ESCWA member countries, the oil exporting countries and the oil importing countries respectively.

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